

LAWRENCE LIVERMORE REPORT

A weekly collection of scientific and technological achievements from Lawrence Livermore National Laboratory: Jan. 25 – Feb. 1, 2010

NIF reaches milestone on road to fusion



National Ignition Facility scientists have taken a huge step toward harnessing the forces that power the sun in an effort to create unlimited energy on Earth.

In experiments at LLNL's NIF, scientists successfully fired an array of 192 laser beams at a helium-filled target no larger than a BB shot and instantly heated it to 6 million degrees Fahrenheit. The gas vanished in a tiny explosion.

The experiments, described in an article in last Thursday's edition of *Science Express* resulted in highly symmetrical compression of simulated fuel capsules -- a requirement for NIF to achieve its goal of fusion ignition and energy gain when ignition experiments begin later this year.

To read more, go to <http://www.sfgate.com/cgi-bin/article.cgi?f=/c/a/2010/01/29/MN5K1BOF4V.DTL&tsp=1>

Scanner offers colossal image of nuclear weapons components



CoLOSSIS was first assembled and tested at Livermore (shown here), then shipped to the National Nuclear Security Administration's Pantex Plant near Amarillo, Texas.

Scientists at Lawrence Livermore have teamed with the Pantex Plant near Amarillo, Texas, to develop a new X-ray computed tomography (CT) system to image nuclear weapon components.

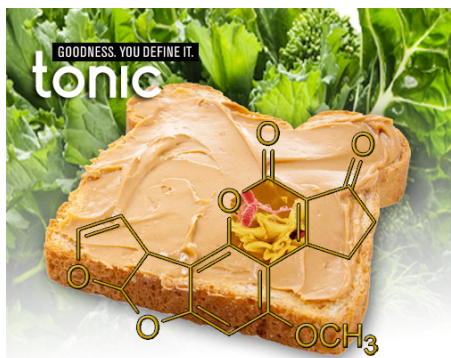
The new CT scan provides a precise non-destructive means for the detection of aging phenomena on nuclear weapon components for evaluation of potential impact, and to provide a basis for assuring a high level of confidence in their continued performance.

Called CoLOSSIS (Confined Large Optical Scintillator Screen and Imaging System), this new high-resolution imaging system is used to scan weapons components to identify any anomalies that require additional attention. The system's software assembles the collected digital radiographs into a large three-dimensional image that scientists can analyze to discover any problems or anomalies in critical weapons components.

This new, state-of-the-art nondestructive tool is similar in concept to CT scanners used by doctors and hospitals to get a view inside the human body without exploratory surgery.

To read more, go to <http://www.sciencedaily.com/releases/2010/01/100126084740.htm>

Greens pack a powerful punch



So kale might not be the most appetizing of the greens, but it and others could help fight off the pesky toxin known as aflatoxin, which can be found in foods such as peanuts and corn.

Thanks to the scientific minds at Lawrence Livermore National Laboratory, there's a new discovery that points to the power of vegetables to literally save a life. LLNL researchers have uncovered the capacity of chlorophyll and chlorophyllin compounds found in spinach, broccoli and kale to ward off the harmful and possibly fatal effects of aflatoxin poisoning.

Aflatoxin is a naturally occurring but dangerous and carcinogenic compound that stems from molds that can form on such foods as corn, peanuts and tree nuts. While aflatoxin risks are more prevalent in developing nations that lack more exacting food handling standards, Lab scientists remind us that trace amounts can enter the food supply at any one of the multiple points in the process, even in industrialized nations.

To read more, go to <http://www.tonic.com/article/leafy-greens-pack-powerful-anti-toxin-punch/>

Melting bling on the BBC



Livermore scientists have proved that diamond melts at around 6 million atmospheres of pressure and 14,000 degrees Fahrenheit.

These experiments mimic conditions on the icy gas giant planets (Uranus and Neptune) where, according to their research, icebergs of diamond could float on a sea of liquid carbon.

LLNL researcher Jon Eggert recently talked with the BBC about how these giant planets may have "diamondbergs" floating around in a sea of carbon.

To hear the interview, go to

https://publicaffairs.llnl.gov/news/lab_report/movies/BBC.mov.

Latest *Newsline* available



Newsline provides the latest Lab research and operations news. See the most recent issue at <https://newsline.llnl.gov>

Photo of the week



Right on target: From right, NIF Director Ed Moses explains how the NIF target chamber operates to Congressman Michael Turner, Phillip Niedzielski-Eichner of the National Nuclear Security Administration and Rudy Barnes, a Turner staff member.

LLNL applies and advances science and technology to help ensure national security and global stability. Through multi-disciplinary research and development, with particular expertise in high-energy-density physics, laser science, high-performance computing and science/engineering at the nanometer/subpicosecond scale, LLNL

innovations improve security, meet energy and environmental needs and strengthen U.S. economic competitiveness. The Laboratory also partners with other research institutions, universities and industry to bring the full weight of the nation's science and technology community to bear on solving problems of national importance.

To send input to the Livermore Lab Report, send e-mail <mailto:labreport@llnl.gov>.

The Livermore Lab Report archive is available at:
https://publicaffairs.llnl.gov/news/lab_report/2009index.html